Blood donors’ knowledge and attitude towards blood donation at North Gondar district blood bank, Northwest Ethiopia: a cross-sectional study

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Abstract
Objective: Blood transfusion saves millions of lives. But, the need and the actual number of donations are not balanced in Ethiopia. The actual reason is not clearly assessed; however, level of knowledge and attitude may be the main contributing factors. Thus, the current study aimed to assess blood donors’ knowledge and attitude towards blood donation at North Gondar district blood bank.

Results: Of 401 blood donors, 142 (35.4%) and 379 (94.5%) were had adequate knowledge and positive attitude towards blood donation, respectively. About 343 (85.5%) of study participants had no previous experience of blood donation. Perceptions of fear of pain, medically unfitness to donate and lack of information on when, where and how to donate blood were mentioned as a reason for not donating blood. Educational status and residence were significantly associated with knowledge of blood donors. On the other hand, participants with secondary and higher education were more likely to have good attitude towards blood donation. Thus, blood banks should design strategies for health education about blood donation and transfusion.

Keywords: Blood donation, Blood donors, Knowledge, Attitude, Gondar, Northwest Ethiopia

Introduction
Blood donation is remained the major source of blood and blood components worldwide. Even though extensive promising research have come up, a true substitute for blood and blood components is not available [1]. Donated blood is an essential component in the management of many diseases. It is the main lifesaving for an individual with loss of large volumes of blood from accidents, hemorrhages or surgery [2].

The source for blood to be transfused relies mainly on voluntary non-remunerated blood donors [3]. Even though over a million of blood units are collected every year, many more millions still need to be collected to meet the global demand, ensure the sufficient and timely provision of blood [4]. However, the demand and supply are not being balanced; the demand is escalating. This is the reason why in Sub-Saharan Africa replacement and paid donors are common in contrary to voluntary and non-remunerated donors [5].

Evidences showed that the annual global blood collection is 112.5 million units of blood. Over half of these units of blood are collected in developed countries. The blood donation rate per 1000 people in high income countries is more than fivefold compered to low income countries (33.1 vs 4.6 donations). Voluntary blood donors cover over 90% of donations in developed countries while they account below 50% in developing countries [6].

Ethiopia is a country with high maternal mortality (676 per 100,000) and high motor accident and with a large nonimmune population for malaria [7]. There is insufficiency and inequity in access to blood. The average...
annual national requirement for blood in Ethiopia is
100,000 units per year, but only 43% is collected [8]. From
WHO African countries, Ethiopia has the least num-er of voluntary blood donors (VBD) with 22% which is
extremely very low [9].

The availability and safety of blood still remain inad-
equate to meet the increased demand of blood and blood
components particularly in Sub-Saharan Africa like Eth-
opia [5, 10]. As a result, these countries try to compen-
sate their blood demand from family replacement or paid
donors. But in this type of donors, higher rates of trans-
fusion-transmitted infections have been documented [6].
It is explained that healthy VBD donate their blood by
their own free will without any pressure, whereas family
replacement donors donate blood for fear of loss of their
relatives without considering their health status [11].

The actual reason why large proportion of the poten-
tially eligible population do not actively donate blood
is not clearly assessed in Ethiopia. The blood donors’
attitude, beliefs, and knowledge may be a factor for not
being a blood donor. Thus, the current study was aimed
to assess blood donors’ knowledge and attitude towards
blood donation at North Gondar blood bank district,
Northwest Ethiopia. The findings will be used as a base-
line information for the blood banks to plan an effec-
tive strategy to increase and maintain safe and adequate
blood supply.

Main text

Methods

Study setting and population
A cross-sectional study was conducted on 401 blood
donors at North Gondar blood bank district, Northwest
Ethiopia. This blood bank is the only blood bank center
located in Gondar for North Gondar, Amhara regional
state, at 738 km far from Addis Ababa, capital city of
Ethiopia. The blood bank gives serves for the surround-
ing hospitals in the district.

Sample size determination and sampling technique
To determine the required sample size for study, a sin-
gle population proportion formula was used as denoted
below.

\[
n = \frac{Z^2 \times p(1-p)}{d^2} = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = 384,
\]

where \(z = 1.96\) at 95% confidence interval, \(p = 0.5\)
because there is no previous study, \(d = 0.05\) which is tol-
erable error between the sample and true population.

Considering 5% non-response rate (384 \(\times 5\% = 19\)), the
final sample size becomes 403. The study participants
were selected randomly from the blood donors in the
blood bank.

Data collection
The study participants were interviewed during blood
donation after obtaining written informed consent. We
used a structured pretested questionnaire to collect socio-demographic data, knowledge, attitude, previous
blood donation history and reasons for not donating
blood previously. In addition to pretest, training was
given for data collectors about data collection proce-
dures and objectives of the study. Consistency of the
collected data was also checked daily.

Knowledge assessment towards blood donation
We used nine questions to assess knowledge of blood
donors. For the “correct” and “incorrect” response,
“1” and “zero” score were used, respectively. Then the
total score was obtained by summing up of the nine
knowledge questions score. The scoring ranges from 0
to 9. Those blood donors who answer “five” and more
questions correctly from 9 (> 50%) were considered as
knowledgeable.

Attitude assessment towards blood donation
In this study, attitude was assessed using eight questions.
Similar to knowledge scoring “1” and “zero” were used for
favorable and unfavorable attitude, respectively. The total
score was calculated up to determine the total attitude
score. The score was ranged from 0 to 8. Attitude score of
half and more (50%) was considered as favorable attitude.

Data analysis and interpretation
Data were entered with Epi info 3.5.1 and transported to
SPSS 20 for analysis. Descriptive results were summa-
rized and presented with tables. The association of the
independent variable with the categorical outcome varia-
ble was measured by calculating odds ratio with 95% con-
fidence interval using bivariate and multivariate logistic
regression. \(P\) value < 0.05 was considered as statistically
significant.

Results

Sociodemographic characteristics of study participants
In this study a total of 401 (259 male and 142 female)
study participants was included. The response rate
was 99.5% (401/403). The mean age of study partici-
ants was 26.2 ± 8.2 years ranging from 18 to 57 years
old. The majority 212 (52.9%) of them was in the age
group of 18–23 years. More than half 235 (58.6%) of the
donors had been attending higher education. Major-
ity 188 (46.9%) and 281 (70.1%) of the study participants
were students and single in marital status, respectively (Table 1).

Knowledge of study participants
From the total study participants, 142 (35.4%) had adequate knowledge towards blood donation. The mean knowledge score of the participants was 4.03 ± 1.44. All of the study participants argued that the importance of blood donation is to save life. From the total study participants, 380 (94.8%) of them had information regarding screening of donated blood for infectious disease before transfusion. But only 20 (5.0%) of the study participants knew HIV, hepatitis virus and syphilis are considered as transfusion transmittable infections (Additional file 1).

Attitude of the study participants
Nearly all [379 (94.5%)] of the study participants had favorable attitude towards blood donation. The mean attitude score of the participants was 7.48 ± 1.23. Majority 365 (91.0%) of the participants had a plan to donate blood voluntarily in the future and about 360 (89.8%) of the study participants had plan to become a regular blood donor. Majority 373 (93%) of the study participants had a perception of donation is not harmful to donors (Additional file 1).

Previous practice of blood donation
Less than one quarter 58 (14.5%) of study participants had previous history of donation and more than half 229 (57.1%) of them were replacement type of donors. Several factors have been mentioned as a reason for not donating blood previously. About 139 (40.5%) of the blood donors mentioned lack of information (when, where and how to donate) as the main reason for not donating blood previously. Fear of pain, perceptions of unfitting to donate and consideration of donation as harmful practice had also been mentioned as a reason for not donating blood previously (Additional file 2).

Factor associated with knowledge of blood donors
In multivariate logistic regression analysis educational status, residence, previous donation history and donor type were significantly associated. Study participants who attained higher education (AOR = 2.8, 95% CI 1.35, 6) and those who lived in urban (AOR = 2.5, 95% CI 1.26, 4.81), history of previous donation (AOR = 2.2, 95%CI 1.13, 4.48) and being volunteer blood donors (AOR = 3.1, 95%CI 1.5, 6.56) were more likely to have adequate knowledge. Age, gender, marital status and occupation were not showed a statistically significant association (Table 2).

Factor associated with attitude of blood donors
Bivariate logistic regression analysis showed that age, educational status, occupation, residence and marital status were significantly associated with attitude of participants. While in multivariate logistic regression analysis none of them were statistically significant. Variables such as gender, previous donation history and donor type did not fulfil the criteria for logistic regression analysis and were excluded from analysis (Table 3).

Discussion
In this study about one-third of blood donors had adequate knowledge towards blood donation. The result was slightly higher than a study conducted in Jordan which reported that 28.6% of them had adequate knowledge towards blood donation [4]. The possible reason for this discrepancy might type of blood donors. In our study, the number of replacement type of blood donors was relatively low (229 vs 348). It is strongly believed that volunteer blood donors are more likely to have good knowledge towards blood donation compared to replacement type donors and it is considered as major contributing

| Characteristics of blood donors | Frequency | Percentage |
|---------------------------------|-----------|------------|
| **Age (years)**                 |           |            |
| 18–23                           | 212       | 52.9       |
| 24–30                           | 97        | 24.2       |
| > 30                            | 92        | 22.9       |
| **Gender**                      |           |            |
| Male                            | 259       | 64.6       |
| Female                          | 142       | 35.4       |
| **Residence**                   |           |            |
| Rural                           | 128       | 31.9       |
| Urban                           | 273       | 68.1       |
| **Marital status**              |           |            |
| Single                          | 281       | 70.1       |
| Married                         | 120       | 29.9       |
| **Education**                   |           |            |
| Up to secondary school attended | 166       | 41.4       |
| Higher education attended       | 235       | 58.6       |
| **Occupation**                  |           |            |
| Student                         | 188       | 46.9       |
| Private work                    | 164       | 40.9       |
| Government Employee             | 49        | 12.2       |
| **Previous donation**           |           |            |
| Yes                             | 58        | 14.5       |
| No                              | 343       | 85.5       |
| **Type of donation**            |           |            |
| Volunteer                       | 172       | 42.9       |
| Replacement                     | 229       | 57.1       |

Table 1 Characteristics of blood donors at North Gondar District Blood Bank, Northwest Ethiopia
factor for blood donation. This study showed that 61% of voluntary and 16.2% of replacement blood donors had adequate knowledge.

On the other hand, the level of knowledge in this study was lower than studies from Gondar [12], Bahir Dar [13], Wolita Sodo [14, 15], Tigray [16], Birbir Town [17], Harar [18], Basrah, Iraq [19] and India [20]. The difference may be associated with the type of study subjects included in the studies. The above-mentioned studies include medical and health science students and also health care workers. Thus, it is expected that this group of people have high level of knowledge towards blood donation.

In the current study, all of the participants argued that the importance of blood donation is to save life. But a previous report from Gondar town showed a slight deviation result of 88.3% [21]. Similarly, it was higher than a study conducted in Democratic Republic of Congo which showed that only 183 (44.1%) of the study participants strongly advocates this idea [22]. The difference might be due to variation in study subjects (blood donors vs general population in the community).

In this study, participants who attained higher education and lived in urban were more likely to have adequate knowledge towards blood donation. This is supported by studies in Birbir Town [17] and Harar [18] in which individuals with higher education has high level of knowledge. Similarly, those donors who were donate blood previously and volunteer donors were had adequate knowledge compared to their counterparts. This is true that if someone had experience, he/she has high level of knowledge. Thus, it is not surprise that if the donors with previous history had adequate knowledge.

Regarding to attitude, nearly all of the respondents had a good attitude towards blood donation. The finding was slightly higher as compared to the previous report from Gondar [12, 21], Bahir Dar [13], Wolita Sodo [14, 15],

| Knowledge assessment items | Knowledge status | COR (95% CI) | AOR (95% CI) |
|----------------------------|-----------------|--------------|--------------|
| Age (years)                |                 |              |              |
| 18–23                      | 101 (47.6%)     | 111 (52.4%)  | 4.3 (2.37, 7.9) | 0.76 (0.24, 2.4) |
| 24–30                      | 25 (25.8%)      | 72 (74.2%)   | 1.6 (0.82, 3.34) | 0.99 (0.36, 2.75) |
| > 30                       | 16 (17.4%)      | 76 (82.6%)   | 1            | 1 |
| Gender                     |                 |              |              |
| Male                       | 69 (26.6%)      | 190 (73.4%)  | 1            | 1 |
| Female                     | 73 (51.4%)      | 69 (48.6%)   | 2.9 (1.9, 4.48) | 1.2 (0.68, 2.07) |
| Residence                  |                 |              |              |
| Urban                      | 126 (46.2%)     | 147 (53.8%)  | 6 (3.38, 10.67) | 2.5 (1.26, 4.81) * |
| Rural                      | 16 (12.5%)      | 112 (87.5%)  | 1            | 1 |
| Marital status             |                 |              |              |
| Single                     | 126 (44.8%)     | 155 (55.2%)  | 5.3 (3.0, 9.4) | 1.7 (0.64, 4.66) |
| Married                    | 16 (13.3%)      | 104 (86.7%)  | 1            | 1 |
| Education                  |                 |              |              |
| Up to secondary school attended | 15 (9.0%)     | 151 (91.0%)  | 1            | 1 |
| Higher education attended  | 127 (54.0%)     | 108 (46.0%)  | 11.8 (6.57, 21.34) | 2.8 (1.35, 6.0) * |
| Occupation                 |                 |              |              |
| Student                    | 103 (54.8%)     | 85 (45.2%)   | 1            | 1 |
| Private work               | 18 (11.0%)      | 146 (89.0%)  | 0.1 (0.06, 0.18) | 0.5 (0.21, 1.40) |
| Government employed        | 21 (42.9%)      | 28 (57.1%)   | 0.6 (0.33, 1.17) | 1.4 (0.54, 3.78) |
| Previous donation          |                 |              |              |
| Yes                        | 35 (60.3%)      | 23 (39.7%)   | 3.4 (1.89, 5.96) | 2.2 (1.13, 4.48) * |
| No                         | 107 (31.2%)     | 236 (68.8%)  | 1            | 1 |
| Donor type                 |                 |              |              |
| Volunteer                  | 105 (61.0%)     | 67 (39.0%)   | 8.1 (5.1, 13.0) | 3.1 (1.5, 6.56) * |
| Replacement                | 37 (16.2%)      | 192 (83.8%)  | 1            | 1 |

AOR Adjusted Odds Ratio, CI Confidence interval, COR Crude Odds Ratio

*Significant variable with a p value less than 0.05 in multivariate analysis
Tigray [16], Birbir Town [17], Harar [18], Basrah, Iraq [19] and India [20]. The difference might be due to variation in study method and subjects since the current study was institutional based study conducted among the blood donors.

We tried to assess the association of blood donors’ characteristics with their attitude. Variables such as age, educational status, occupation, residence and marital status were assessed, but none of them showed statistically significant association. Nearly all (94.5%) of the study participants had favorable attitude towards blood donation.

**Conclusion**

In this study, attitude towards blood donation was high, but the level of knowledge was inadequate. Education, residence, previous blood donation and donor type were statistically associated with adequate knowledge. To increase the level of knowledge towards blood donation, health education to the community is recommended.

**Limitations**

The findings in this study are from one district and only interview-based data were collected. There was no focus group discussion for further analysis of the knowledge and attitude of the participants.

**Supplementary information**

Supplementary information accompanies this paper at https://doi.org/10.1186/s13104-019-4776-0.

**Additional file 1.** Knowledge and attitude questions response of blood donors towards blood donation at North Gondar District Blood Bank, Northwest Ethiopia.

**Additional file 2.** Blood donation practice of blood donors North Gondar District Blood Bank, Northwest Ethiopia.

**Abbreviations**

AOR: Adjusted Odds Ratio; CI: confidence interval; COR: Crude Odds Ratio; HBV: hepatitis B virus; HCV: hepatitis C virus; VBD: voluntary blood donors; WHO: World Health Organization; VNRBD: voluntary non-remunerated blood donors.

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**Table 3 Logistic regression of attitude with socio-demographic status of the study participants in North Gondar District blood bank, North west Ethiopia**

| Attitude assessment items | Attitude status | COR (95%CI) | AOR (95%CI) |
|---------------------------|----------------|------------|-------------|
|                           | Good           | Poor       |             |
| Age (years)               |                |            |             |
| 18–23                     | 206 (97.2%)    | 6 (2.8%)   | 4.7 (1.67, 13.03) | 0.9 (0.17, 5.11) |
| 24–30                     | 92 (94.8%)     | 5 (5.2%)   | 2.5 (0.83, 7.5) | 1.2 (0.32, 4.25) |
| > 30                      | 81 (88.0%)     | 11 (12.0%) |             |             |
| Gender                    |                |            |             |
| Male                      | 238 (91.9%)    | 21 (8.1%)  |             |             |
| Female                    | 141 (99.3%)    | 1 (0.7%)   |             |             |
| Residence                 |                |            |             |
| Urban                     | 267 (97.8%)    | 6 (2.2%)   | 6.4 (2.43, 16.67) | 2.2 (0.6, 8.21) |
| Rural                     | 112 (87.5%)    | 16 (12.5%) | 1            | 1            |
| Marital status            |                |            |             |
| Single                    | 274 (97.5%)    | 7 (2.5%)   | 5.6 (2.22, 14.1) | 2.2 (0.46, 10.66) |
| Married                   | 105 (87.5%)    | 15 (12.5%) | 1            | 1            |
| Education                 |                |            |             |
| Have no formal education  | 38 (76.0%)     | 12 (14.0%) | 1            | 1            |
| Have formal education     | 341 (97.2%)    | 10 (2.8%)  | 10.8 (4.36, 26.58) | 3.4 (0.98, 12.02) |
| Occupation                |                |            |             |
| Student/employee          | 312 (97.5%)    | 8 (2.5%)   | 8.1 (3.29, 20.2) | 1.6 (0.35, 6.99) |
| Farmer                    | 67 (82.7%)     | 14 (17.3%) | 1            | 1            |
| Previous donation         |                |            |             |
| Yes                       | 57 (98.3%)     | 1 (1.7%)   |             |             |
| No                        | 322 (93.9%)    | 21 (6.1%)  |             |             |
| Donor type                |                |            |             |
| Volunteer                 | 172 (100%)     | 0          |             |             |
| Replacement               | 207 (90.4%)    | 22 (9.6%)  |             |             |

NB Gender, previous donation and donor type do not fulfill the criteria for logistic analysis, AOR Adjusted Odds Ratio, CI Confidence interval, COR Crude Odds Ratio
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Authors’ contributions
BE and ES participated in designing the study, supervised the data collection, analyzed, interpreted and write up the manuscript. AY involve in proposal development, data collection and entry of data for analysis. BE and ES are the joint first authors of the paper. All authors read and approved the final manuscript.

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Availability of data and materials
The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

Ethics approval and consent to participate
The research was conducted after securing ethical approval letter from Research and Ethical Review Committee of School of Biomedical and Laboratory Science, University of Gondar. Permission was asked from North Gondar District blood bank and written informed consent had been obtained from each study participant. To ensure confidentiality of participants’ information, anonymous typing was applied whereby the name of the participant and any identifier of participants were not written on the questionnaire, and during the interview to keep the privacy, they were interviewed alone.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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