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## Assessment of Clinical Medical Student's Knowledge, Attitude, and Factors Affecting Practice of Voluntary Non-Remunerated Blood Donation in a Medical College in Southeast Nigeria; A Cross-Sectional Study

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### ABSTRACT

**Background:** Voluntary non-remunerated blood donation (VNRBD) is essential for maintaining a safe and adequate blood supply. However, in many developing countries, including Nigeria, VNRBD rates remain low, with significant reliance on replacement and paid donors. Medical students, as future healthcare providers, are expected to be advocates for voluntary blood donation. This study assesses the knowledge, attitudes, and factors influencing the practice of VNRBD among clinical medical students at Nnamdi Azikiwe University Teaching Hospital, Southeast Nigeria.

**Methods:** A cross-sectional study was conducted among 115 clinical medical students selected through a stratified sampling technique. Data were collected using a structured self-administered questionnaire assessing knowledge, attitudes, and practices regarding blood donation. Descriptive and inferential statistics were performed using SPSS version 25.0.

**Results:** All participants (100%) had heard about blood donation, with mass media (37.0%) being the most common source of information. While 92.1% of respondents had a positive attitude toward blood donation, only 37.2% had ever donated blood, and just 40.0% practiced VNRBD. Major barriers to donation included fear of dizziness (41.7%), concerns about inadequate blood volume (40.9%), and fear of needles (35.7%). The primary motivation for blood donation was the desire to help others (73.9%).

**Conclusion:** Despite high awareness and positive attitudes, actual participation in voluntary blood donation among clinical medical students remains low. Addressing misconceptions, implementing targeted educational interventions, and fostering institutional support may enhance VNRBD rates. Medical schools should integrate blood donation awareness programs to encourage a culture of regular voluntary blood donation.

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**Introduction**

Voluntary non remunerated blood donation (VNRBD) forms the firm foundation of blood transfusion service of a country [1]. It is when a person gives blood and receives no payment for it either in the form of cash or in any kind that could be considered a substitute for Money [2]. Transfusion of blood is an essential element to the management of patients with various diseases [1,2]. Blood transfusion remains a vital aspect in the management of patients presenting with accidents, surgical conditions, pregnancy, malignancy among others [3,4]. Blood donation is when an individual gives/allows some of his/her blood to be used for medical purposes to help another person whereas blood transfusion is a process in which blood that has been taken from one person is put into another person's system, especially after an accident or during operation/medical purposes or when the need arises.5 "Safe blood starts with me, blood saves lives." was the W.H.O theme for 2000 AD. Millions of people owe their lives to people they will never meet – people who donate their blood freely and without any reward. However, the overwhelming majority of the world's population has no access to safe and adequate blood [4,5]. Despite the crucial role of blood in management of patients with severe disease conditions, People in the developing countries, especially women, still die every day from complications related to pregnancy and childbirth. Also, children die every day from severe anaemia secondary to malaria and/or malnutrition [5]. All these deaths could have been prevented if there was adequate supply of blood.

According to Victor H. et al, an ideal donor should be between 17yrs-70yrs, weigh at least 50kg, have not donated blood in the past 3months and must not have any of the transfusion transmitted infections (TTIs). The prospective donor should also have a normal Packed Cell Volume (Haematocrit), 45-54% for males and 40-45% for females.6 Values below this range are considered anaemic hence the donor is ineligible. Blood donors fall into 3 types, voluntary non remunerated donors (VNRBD), family/replacement donors and paid donors [2]. An adequate and reliable supply of safe blood can be assured by a stable base of regular, voluntary, non-remunerated blood donors, who have been reported to be the safest group of donors as the prevalence of blood borne infections is lowest among these donors [2]. Currently, voluntary blood donors account for less than half of the blood supply in developing countries. Inadequate blood donation in Sub-Saharan Africa is a major public health problem [7]. At Nigeria's current level of health care delivery, it is estimated that about 1.5 million units of blood would be required annually.1 However, a National Blood Transfusion Baseline Survey in 2005 showed that only about half a million units of blood were collected in the previous 1 year with paid donors accounting for more than 90% of blood donated. The survey further revealed that in the public sector, 25% and 75%, respectively, were commercial (paid) and replacement donors, while voluntary non remunerated donors were negligible. In the private sector, the reverse was obtained with 75% and 25%, respectively, being commercial and replacement donors, while voluntary non remunerated donors were insignificant [8]. This is

worsened by the statistics that people already infected with HIV through unsafe blood transfusion in Nigeria account for the second largest source of HIV infection among infected individuals [4]. There is need to ascertain the knowledge and attitude of non-remunerated voluntary blood donation among medical students. The attitude, beliefs, and level of knowledge associated with blood donation may affect the disposition of potential donors to blood donation. Clinical Medical Students in Nnamdi Azikiwe University Teaching Hospital are expected to have a good knowledge of blood usage, to be aware of the increasing demand and scarcity of the products, and are thus expected to donate as well as encourage voluntary blood donation among the public as they're a point of reference for the Public. Young people may be the hope and future of safe blood supply in the world. As the majority of them will be pursuing their education, universities and colleges can become a good platform for motivational activities. It is therefore important to understand the prevailing attitude toward blood donation among clinical medical students. Students constitute an important part of the literate society worldwide. Medical students as future doctors are in a strategic position to enlighten and serve as role models to the general population with regard to voluntary blood donation. Assessing their knowledge and attitude toward blood donation may help identify gaps which will be addressed. Clinical students, by virtue of being in the hospital environment, are expected to have good knowledge and positive attitude toward voluntary blood donation and to serve as a source of voluntary blood donors. Having good knowledge about blood donation will also help equip them with facts and information to educate the masses and mobilize voluntary blood donors. Thus, the objective of this study was to determine the knowledge, attitudes and practices of medical students toward voluntary non-remunerated blood donation as well as assess identifying the factors affecting medical students' voluntary non remunerated blood donation in Nnamdi Azikiwe teaching Hospital.

**Materials and Methods**

**Study Design, Setting, Population, and Ethical Considerations**

This was a Cross- sectional descriptive study design conducted amongst clinical Medical students in the college of health sciences Nnamdi Azikiwe University Nnewi, Anambra state. Nnamdi Azikiwe University teaching hospital (NAUTH) is a federal government teaching hospital located at Akamili village in Nnewi town of Nnewi local Government area. It provides primary, secondary, tertiary care services as well as serving as referral centre for people in the state and neighboring Delta, Imo and Kogi states. NAUTH, Nnewi offers services in all clinical specialties, as well as community health. It offers residency training programs in all specialists.

Ethical clearance was obtained from the College of Medicine Research and Ethics Committee (COMREC) University of Nigeria with the PROTOCOL NO: 0128/03/2021. Prior to data collection, an ethical approval letter was obtained from the Institution. Written informed consent was obtained from the study participants after explaining the purpose of the study. Study participants were also informed that their answers are confidential and they have right not to participate in the study, not to answer any of the question or to withdraw from the study at any time.

### Inclusion Criteria

All dental students in their 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> year clinical Medical students in the college of health sciences Nnamdi Azikiwe University Nnewi, Anambra state who has given consent to participate in the study were included in the study.

### Exclusion Criteria

At 400 Level, a course in Haematology and Blood transfusion is offered as part of the curriculum for clinical students thus, medical students in pre-clinical class (100 – 300 Levels) were excluded from the study to prevent bias and those who were absent during data collection and were not volunteers to participate in the study and the extension students were excluded as well.

### Sample Size Determination

Using the proportion of medical students willing to voluntarily donate blood in a similar study (85.9%) (14), a minimum sample size of 115 was calculated using the appropriate formulae as seen below for a descriptive study. The respondents were selected using stratified sampling technique. The respondents' level of study formed the basis of each stratum. Sampling frame for the study was 306 (comprising 106, 116 and 80 students in 400, 500 and 600 level respectively). Proportional allocation was used to select the number of students required to partake in the study from each level. At each level, systematic sampling was used to select the respondents. The first respondent was selected using simple random sampling.

The Sample size was calculated using The sample size was calculated using the formula

$$n = (Z^2 \times pq) \div d^2 \quad (12)$$

Where n= sample size

Z= standard deviation corresponding to a confidence interval of 95% (1.96).

d= degree of freedom

p= universal precaution practice score among Clinical Medical students who are Voluntary Non remunerated blood donors which is 85.9%

Workings

$$n = (1.96^2 \times 0.859 \times 0.141) \div 0.05^2$$

$$n = 0.465 \div 0.0025$$

Thus the answer is 186.

Since the population is less than 10,000, a modified formula for population less than 10,000 will be used

nF= n ÷ (1 + n/N) (13) Where nF = desired sample size when population is less than 10,000

n= desired sample size when population is less than 10,000

N= total population of Clinical Medical students being studied

In 400l class we have 106 students

In 500l class there are 116 students

In final year(600l) class there are 80 students

Making it a total of 306 students

$$\text{Thus } nF = 186 \div (1 + (186/306))$$

$$nF = 186 \div 1.6078$$

$$nF = 115$$

115 will be the total population that will be used for the study

### Sampling Frame

Sample frame will be estimated approximately the number of students in both 400L, 500L and 600L in total are 306 in number.

$$\text{So, the sampling frame} = \frac{306}{n}$$

$$n = 115$$

$$\text{Sampling interval} = \frac{306}{115} = 2.7$$

### Sampling Technique

To obtain a representative sample, a systematic random sampling technique was applied. First, the students were categorized according to their class levels. The first participant was selected by simple random sampling based on the sampling fraction, therefore, the number of first student included was randomly chosen using the lottery method.

### Study Instruments

The data was collected using a standardized and well-structured self-administered questionnaire that was prepared in English and explained in simple terms to the respondents for easy understanding. The data collection instrument was previously tested in 5% of similar students from each department to verify validity and reliability. The study was supervised by the principal investigators during the entire data collection period.

### Data Collection

A well-structured questionnaire was administered, the respondents were guided through the questions as they filled the questionnaire used to assess the characteristics of socio-demographic status, as well as their knowledge, attitude and practice towards blood donation. To increase the quality of the data, most of the questions were compared with previously conducted studies with some changes applied depending on the local context. Likewise, the confidentiality of the study was confirmed. Data were collected while students were in the classrooms.

### Data Analysis

After data collection, the integrity and consistency of each questionnaire was verified. Then, the data was analyzed using the statistical software SPSS 25.0. For descriptive statistics, the results were presented in terms of proportions or percentages.

### Results

Out of the one hundred and fifteen (115) participants recruited in this study, it was observed that most of the participants fell within the age group of 20-23 years with 68(62.39%). The study participants had a mean ± SD age of 23.25 ± 2.800 years. Also, the study had more of female 72(62.61%), than males 43(37.39%) and recruited more of 400level clinical medical students 53(46.09%). More illustrations are showing in table 1.

**Table 1: Showing the Socio-Demographics of the Study Participants**

Socio-Demographics	Frequency	Percentage
<b>Age Group</b>		
20-23 years	68	62.39
24-27 years	35	32.11
28-31 years	2	1.83
32-35 years	4	3.67
Mean ±SD	23.25±2.800	
<b>Gender</b>		
Females	72	62.61
Males	43	37.39
<b>Education Level</b>		
400 level	53	46.09

500 level	40	34.78
600 level	22	19.13
<b>Religion</b>		
Others	3	2.61
Christian	112	97.39
<b>Marrital Status</b>		
Married	8	7.02
Single	106	92.98
<b>Tribe</b>		
Igbo	111	100

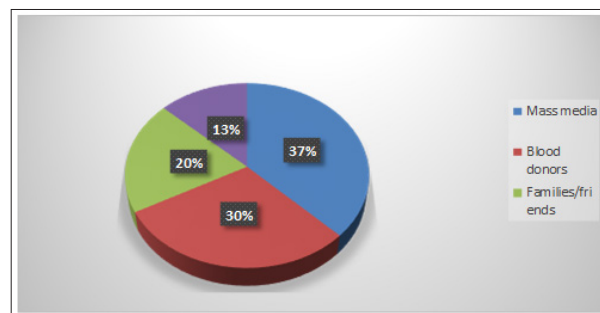
All participants (100%) had heard about blood donation. The primary sources of information were mass media (37.00%), blood donors (30.00%), family/friends (20.00%), and other sources (13.00%).

All respondents (100%) acknowledged that infections could be transmitted through blood transfusion. However, knowledge of blood donation frequency varied; while 54.46% correctly stated that blood could be donated every three months, 22.32% believed it should be done every six months, and 21.43% indicated that they did not know. When asked about donor eligibility, 68.70% stated that "anyone who is healthy" could donate blood, 42.60% believed only men aged 18–60 years could donate, and 22.61% thought women aged 18–60 years were eligible. A small proportion (0.87%) identified vulnerable individuals as eligible donors (Table 2).

**Table 2: Shows the Level of Student's Perception towards Voluntary Non Remunerated Blood Donation**

Knowledge On Voluntary Non Remunerated Blood Donation	Frequency	Percentage
<b>Have you Heard about Blood Donation</b>		
Yes	115	100.00
<b>What are your Sources of Information?*(%=100)</b>		
Mass media	83	37.00
Blood donors	66	30.00
Families/friends	44	20.00
Other sources	29	13.00
<b>Can a Person be Infected by Receiving Blood Transfu-sion?</b>		
Yes	115	100
<b>How Often can an Individual Donate Blood?</b>		
Annually	2	1.79
Don't know	24	21.43
Every 3months	61	54.46
Every 6months	25	22.32
<b>Who Should Donate Blood?*</b>		
Men 18-60years	49	42.60
Vulnerable group	1	0.87
Women 18-60 years	26	22.61
Anyone who is healthy	79	68.70

\*Multiple response



**Figure 1:** Showing the Sources of Information on Voluntary Non-Remunerated Blood Donation of the Study Participants

A larger proportion of the participants had mass media 83(37.00%) as their source of information on voluntary non remunerated blood donation and agreed that blood donation should be done every 3months 61(54.46%) by men aged 18-60 years 49(42.60%).

A majority (92.11%) of participants viewed blood donation as a good practice, 5.26% had a negative perception, and 2.63% expressed no opinion.

A large proportion (81.98%) supported the idea that blood donors should receive incentives, while 18.02% disagreed. Regarding blood safety, 69.23% believed that voluntary non-remunerated blood donation is the safest source of blood, while 27.88% disagreed, and 2.88% were uncertain.

Concerns regarding potential harm during or after blood donation were reported by 88.18% of participants, whereas 11.82% disagreed. The most commonly perceived adverse effect was temporary weakness (100%), followed by infection risk (59.79%), illness (44.32%), and other minor effects (11.34%) (Table 3).

**Table 3: Level of Attitude towards Voluntary Blood Donors by the Study Participants**

Level Of Attitude Towards Voluntary Blood Donors	Frequency	Percentage
<b>What do you think about Blood Donation</b>		
Bad	6	5.26
Good	105	92.11
No idea	3	2.63
<b>Do you think Incentives Should be given to Blood Donors</b>		
No	20	18.02
Yes	91	81.98
<b>Do you think Voluntary non Remunerated Blood Donation is the best Source of Blood Donation to Make Blood Safe</b>		
Don't know	3	2.88
No	29	27.88
Yes	72	69.23
<b>Could harm Occur to a Blood Donor During or After Blood Donation</b>		
No	13	11.82
Yes	97	88.18
<b>What can Happen to a Blood Donor During or After Blood Donation*</b>		
Contract infection	58	59.79

Temporary weakness	97	100.00
Fall sick	43	44.32
Others	11	11.34

**Multiple Response**

105(92.11%) of the participants agreed to blood donation as good practice and 91(81.98%) thinks donors should be given incentives after donation, believing that Temporary weakness 97(100.00%) is a major harm that can occur to a donor during or after blood donation.

Among participants, 37.17% had previously donated blood, while 62.83% had never donated. The primary reason for donation was family/replacement donation (64.28%), followed by checking blood parameters (23.81%), and other personal reasons (45.24%).

Among those who had never donated (N=71), the most frequently cited reasons included never having thought about it (33.80%), fear of post-donation fainting (30.96%), lack of time (26.76%), and low packed cell volume (25.35%). Other reasons included religious beliefs (9.86%), fear of HIV screening (1.41%), and other personal concerns (7.04%).

Regarding donation frequency, 47.62% of donors had donated once, 30.95% had donated twice, and 21.99% had donated more than twice. In the past year, 73.68% of participants had not donated blood, while 26.32% had done so. Furthermore, only 40.00% reported practicing voluntary non-remunerated blood donation, while the majority (60.00%) had donated for family/replacement needs (Table 4).

**Table 4: Practice of Blood Donation by the Study Participants**

Practice Of Blood Donation	Frequency	Percentage
Ever Donated Blood		
No	71	62.83
Yes	42	37.17
Reason for Donating Blood*		
Family/replacement Donation	27	64.28
To Know Blood Parameters	10	23.81
Others	19	45.24
Reasons for not Donating Blood*(N=71)		
Never Thought About it	24	33.80
Lack of Time	19	26.76
Family Member not in Need	10	14.08
Fear of Post Donation Fainting	22	30.96
Low PCV	18	25.35
Fear of HIV Screening	1	1.41
Religious Beliefs	7	9.86
Others	5	7.04
Number of times Donated		
Once	20	47.62
Twice	13	30.95
Others	9	21.99

Have you donated blood in the past one year		
No	70	73.68
Yes	25	26.32
Do you practice voluntary non remunerated blood donation		
No	51	60.00
Yes	34	40.00

**Multiple Response, N=Total Study Population**

The most common motivation for blood donation was the desire to help others (73.91%). Other reasons included knowing one's genotype or blood group (15.65%), receiving health counselling (11.30%), and determining HIV status (14.78%). A smaller proportion cited monetary gain (13.91%) and receipt of gifts (6.09%) as motivating factors.

Barriers to voluntary donation were widely reported. The most frequently cited deterrents included fear of dizziness or fainting (41.74%), perceived insufficient blood volume (40.87%), and fear of needles (35.65%). Other barriers included fear of exposure to HIV infection (26.09%), religious beliefs (15.65%), and cultural beliefs (11.30%) (Table 5).

**Table 5: Motivating Factors for Blood Donation by the Study Participants**

Motivating Factors For Blood Donation	Frequency	Percentage
<b>What are the Reasons for Willingness to Voluntary Blood Donation* (N=115)</b>		
Desire to help	85	73.91
Monetary gain	16	13.91
Receipt of gift	7	6.09
To know Genotype/ Blood Group	18	15.65
To get Health Counsel	13	11.30
To Know HIV Status	17	14.78
Others	5	4.35
<b>What are the Reasons for not Willingness to Voluntary Blood Donation* (N=115)</b>		
Culture	13	11.30
Religion	18	15.65
Fear of needle	41	35.65
Fear of Dizziness or Fainting	48	41.74
Insufficient Blood	47	40.87
Fear of Exposure to HIV Infection	30	26.09
Others	7	6.09

**Multiple Response, N=Total Study Population**

**Discussion**

This study aimed to assess the knowledge, attitudes, and practices regarding voluntary non-remunerated blood donation (VNRBD) among clinical medical students. Understanding these factors is essential in addressing barriers and improving blood donation rates among young adults, particularly those in the medical field who are expected to have better awareness and positive attitudes toward blood donation.

### **Sociodemographic Characteristics**

The study recruited 115 clinical medical students, with the majority (62.39%) falling within the age group of 20–23 years. The mean age of the participants was  $23.25 \pm 2.800$  years, indicating a relatively young population. The gender distribution showed a higher proportion of females (62.61%) compared to males (37.39%). Most of the participants were in their 400-level of study (46.09%), with fewer students in higher levels (34.78% in 500-level and 19.13% in 600-level). This distribution may influence knowledge and attitudes, as students in later clinical years might have more exposure to topics related to transfusion medicine.

A significant majority (97.39%) of the participants identified as Christians, with only 2.61% identifying with other religions. Additionally, nearly all participants (92.98%) were single, which is consistent with the expected demographic of university students. Interestingly, all the participants (100%) identified as Igbo, suggesting a homogeneous ethnic composition of the study sample, which may limit the generalizability of the findings to other ethnic groups.

The findings of this study align with and extend existing research on knowledge, attitudes, and practices (KAP) toward voluntary non-remunerated blood donation (VNRBD), particularly among medical students and young adults. A review of related literature highlights both similarities and differences with previous studies conducted in various settings.

### **Knowledge of Blood Donation**

Several studies have reported high awareness levels regarding blood donation among university students, particularly medical students. For example, a study conducted among medical students in Gaza reported high awareness levels, with 98.7% having heard about blood donation, and mass media being a significant information source which is comparable to the 100% awareness observed in this study [9]. Similarly, a study in Ethiopia by Melku et al. (2018) reported that 93% of university students had heard of blood donation. These findings confirm that knowledge levels among educated youth are generally high, particularly in medical fields [10].

However, misconceptions persist regarding donation frequency and eligibility criteria. In this study, only 54.46% correctly identified that blood donation can be done every three months, while 21.43% were uncertain. A study in India by Dubey et al. (2016) also found that while medical students had good knowledge, misconceptions regarding eligibility criteria were common, particularly regarding gender-based restrictions [11]. This highlights the need for better education on donor eligibility and donation intervals, even among medical students.

### **Attitudes toward Blood Donation**

The generally positive attitude towards blood donation observed in this study (92.11% believing donation is a good practice) aligns with findings from other studies. For example, a study by Ewurum et al. (2020) in Nigeria found that 93.5% of medical students had positive attitudes toward blood donation [12]. However, despite these positive attitudes, many students still believed that incentives should be given to donors (81.98%). This is consistent with findings a study among Saudi medical students revealed that while 51.7% had a positive attitude towards blood donation, a significant portion (49.1%) supported blood importation from other countries, indicating a less proactive stance towards local

donation efforts [13]. This suggests that while students recognize the importance of blood donation, there is still a preference for some form of compensation, which contradicts the principles of voluntary, non-remunerated donation.

### **Practice of Blood Donation**

Despite high knowledge and positive attitudes, actual blood donation rates remain low, a trend observed in multiple studies. In this study, only 37.17% of participants had ever donated blood, and only 26.32% had donated in the past year. These findings are consistent with studies from other low- and middle-income countries (LMICs). For instance, a study in Nigeria by Salaudeen et al. (2011) found that only 30% of medical students had ever donated blood [14]. Similarly, a study in Ethiopia (Melku et al., 2018) reported that only 28% of students had donated at least once [10].

By contrast, studies in developed countries report higher donation rates among medical students. For example, a study in Qatar by Ibrahim and Abdallah (2021) found that over 60% of medical students had donated blood at least once. The differences could be attributed to cultural factors, stronger voluntary blood donation programs, and better public awareness campaigns in high-income countries [15].

The dominance of replacement donation over voluntary donation observed in this study is also consistent with previous research. In this study, 64.28% of donors reported donating for family/replacement purposes rather than voluntarily. Similarly, a study in Ghana by Baidoo et al. (2024) found that 70% of students donated blood only when a family member needed it [16]. This highlights a persistent reliance on replacement donation in many African and Asian countries, which is a major barrier to achieving a stable, voluntary donor pool.

### **Barriers to Blood Donation**

The most commonly reported barriers to blood donation in this study were fear of dizziness/fainting (41.74%), insufficient blood (40.87%), and fear of needles (35.65%). These findings are consistent with studies in other settings. For instance, a study reported that fear of weakness (45%), fear of needles (38%), and lack of time (28%) were the most common reasons for not donating blood [15]. Similarly, studies in Ethiopia and Ghana also identified fear of post-donation side effects as a major deterrent [17,18].

Religious and cultural beliefs were less frequently cited barriers in this study (15.65% and 11.30%, respectively), which is similar to findings by Harrington. However, studies in the Middle East have reported stronger religious and cultural influences on blood donation behavior [19]. This suggests that while religious factors may play a role, they are not the primary barrier to blood donation among medical students in this study's setting.

### **Motivating Factors for Blood Donation**

The most significant motivation for blood donation in this study was altruism (73.91%), which is consistent with global trends [8-20]. Studies have also reported that the primary motivator for donation is the desire to help others. However, 13.91% of participants in this study mentioned monetary gain as a motivator, a trend also observed in studies from India and Nigeria [11,12]. This suggests that while altruism is a strong driver, financial incentives may still influence donation decisions in some settings.

Another interesting finding was that 14.78% of participants in this study donated blood to know their HIV status. This is comparable to findings by Salaudeen et al., who reported that 16% of Nigerian

students donated blood for the same reason.<sup>14</sup> This suggests that some individuals may use blood donation as a form of health check-up, which could have implications for donor recruitment strategies which is in discordance by a study by Samir where fear of knowing HIV is a barrier to donation.

### Recommendations

Based on the findings of this study, several strategies can be implemented to enhance voluntary non-remunerated blood donation (VNRBD) among medical students. First, there is a need for enhanced education on blood donation to address misconceptions regarding donation frequency, eligibility, and potential health effects. Incorporating blood donation awareness into the medical curriculum and organizing regular sensitization programs will help reinforce accurate knowledge and encourage participation.

Addressing the barriers to blood donation is also crucial. Many participants in this study cited fear of dizziness, weakness, or contracting infections as deterrents. Therefore, targeted seminars and workshops should be conducted to reassure students about the safety of blood donation. Additionally, pre-donation counseling should be provided to alleviate concerns about anemia and low packed cell volume (PCV), which were frequently mentioned as reasons for not donating blood.

To encourage a shift from replacement donation to regular voluntary donation, institutions should establish university-based blood donor clubs in collaboration with local blood banks. These clubs can create structured donation schedules that align with students' academic commitments, making it more convenient for them to participate without feeling pressured by time constraints.

Given that mass media was identified as a primary source of information, leveraging media and digital platforms can play a significant role in advocacy. Universities should utilize social media, student newsletters, and campus radio stations to promote accurate information about blood donation. Personal testimonials from student donors can also be featured to encourage peer participation and normalize blood donation as a routine practice.

Although many participants in this study supported incentives for blood donors, monetary compensation contradicts the principles of voluntary donation. Instead, non-monetary motivational strategies should be adopted, such as recognition awards, certificates, and commendation letters. Organizing annual blood donation drives with interactive activities can also increase student engagement and participation.

Lastly, cultural and religious concerns regarding blood donation must be addressed. Universities should collaborate with religious and cultural leaders to educate students on the compatibility of blood donation with various belief systems. Additionally, culturally sensitive educational materials should be developed to dispel myths that discourage participation.

By implementing these strategies, medical institutions can cultivate a culture of voluntary blood donation, ensuring a sustainable and reliable blood supply while fostering a sense of altruism and social responsibility among future healthcare professionals.

### Conclusion

This study revealed that while medical students demonstrated high levels of awareness and positive attitudes toward blood donation, actual donation rates remained low, with many engaging in donation only for family/replacement purposes. Fear of post-donation effects, lack of time, and misconceptions about eligibility criteria were key

barriers to participation.

To increase voluntary blood donation rates, interventions should focus on education, addressing fears, and implementing structured blood donation programs within universities. Leveraging mass media, integrating awareness campaigns into medical curricula, and promoting non-monetary incentives can help foster a culture of voluntary, habitual blood donation. By adopting these strategies, institutions can enhance the sustainability of blood donation programs, ensuring a steady and safe blood supply for those in need.

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