

# Effect of Blood Donor Educational intervention on the knowledge and Attitude towards Voluntary Blood Donation among Medical Students at a Nigerian University

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## Abstract

**Background:** Blood is a veritable tool in many life-saving situations. Despite the increased demand for blood, the supply of safe blood has been inadequate. This study was aimed to determine the effect of educational intervention on the knowledge and attitude of medical students of a Nigerian University to voluntary blood donation. **Materials and Methods:** This was a cross-sectional study involving 158 undergraduate medical students of Ebonyi State University in South-East Nigeria. Participants were recruited by stratified sampling technique. A pretested semi-structured participant administered questionnaire was used to baseline knowledge and attitude to voluntary blood donation. This was followed by educational intervention in the form of a workshop by experts in blood transfusion medicine. Then, postintervention assessment was done using the initial questionnaire 30 days later. The study was approved by the Research and Ethics Committee of Ebonyi State University, Abakaliki. Data obtained were analyzed using SPSS 20 software, and *P* value was set at  $\leq 0.05$ . **Results:** Of the 158 medical students who participated in the study, there were 90 (57%) males and 68 (43%) females. Baseline proportion of the participants who had good knowledge was high (72.8%), while baseline attitude of the participants was positive to most aspects of voluntary blood donation. Post intervention, the level of knowledge about voluntary blood donation increased to 99.4%, and similarly attitude to voluntary blood donation improved. **Conclusion:** Educational intervention was effective in improving the knowledge and attitude towards voluntary blood donation among medical students. Continuous enlightenment will influence potential blood donors to have better knowledge and positive attitude toward voluntary blood donation.

**Keywords:** Attitude, blood donation, educational intervention, knowledge, medical students

## INTRODUCTION

Blood is the most donated tissue in medical practice and used as a veritable tool in many life-saving medical conditions if used appropriately. Blood is essential to life, circulates through the body, and delivers essential substances such as oxygen and nutrients to the body cells and removes metabolic waste products from the body cells.<sup>1</sup> Blood is given to restore lost blood and to improve the ability of the blood to deliver oxygen to the body tissues. The importance of blood transfusion in medical practice cannot be overemphasized as millions of lives have been saved since the discovery of ABO blood groups.<sup>2</sup> Despite advances in medical research, an ideal substitute for blood is yet to be found, hence blood donation is still the only viable option for persons with different medical conditions that

require blood transfusion.<sup>3</sup> There has been increasing demand for blood transfusion, particularly in developing countries, due to injuries sustained following road traffic accidents, obstetric-related blood loss, surgical emergencies, and various medical

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conditions that necessitate blood transfusion.<sup>4</sup> Globally, an estimated 80 million units of blood are donated annually and only 38% are collected in the developing world where 82% of the population live and where the need is enormous.<sup>5</sup> The World Health Organization advocates that if 1% of a country's population donates blood, it would be sufficient to meet the country's basic requirement for blood.<sup>5</sup> However, 82% of the global population who live in developing countries have access to only 40% of the blood needed. Unfortunately, 60% of this blood is collected from paid commercial and family replacement blood donors rather than from voluntary, nonremunerated, low-risk donors.<sup>6</sup>

Inadequate blood donation in the sub-Saharan Africa is a major public health problem.<sup>7</sup> Shortage of blood has serious consequences given that blood transfusion is an essential component of modern health care. In Africa, many preventable deaths occur because there are insufficient blood donations to meet patients' needs as many patients requiring transfusion do not have timely access to safe blood.<sup>7</sup>

All blood components and manufactured blood products originate from blood donors, so the safety of blood transfusion begins with careful selection of donors. An adequate and reliable supply of safe blood can be assured by a stable base of regular, voluntary, unpaid blood donors, who are the safest group of donors as the prevalence of blood-borne infections is lowest among these donors.<sup>8</sup> In spite of the relevance of blood donation, the major challenge to the transfusion of blood is meeting the increasing demand for blood and ensuring its constant supply.

Education is an important aspect of a donor recruitment strategy. Donor education, motivation, and recruitment campaign has three basic goals: (i) to promote changes in the public's knowledge, attitudes, and beliefs so that they understand why blood donation is a vital, life-saving service to the community; (ii) to promote changes in people's behavior so that they become willing to donate blood voluntarily on regular basis without payment; and (iii) to ensure that potential donors understand the importance of safe blood donation so that they do not donate blood if they are in poor health or at risk of transmitting transfusion transmissible infections.<sup>9</sup>

Students constitute an important resource globally. Medical students are future doctors and are in a strategic position to enlighten and serve as role models to the general population as regards voluntary blood donation. Assessing their knowledge and attitude toward blood donation will help to identify gaps. Intervention in the form of blood donor education and enlightenment will address the identified knowledge gaps with subsequent improvement in willingness to donate blood regularly. Therefore, this study was to determine the effect of blood donor educational intervention on the knowledge and attitude of medical students toward voluntary blood donation.

## MATERIALS AND METHODS

### Study design

This was a cross-sectional study during which baseline knowledge and attitude to blood donation was assessed and blood donor education was provided for the participants and the knowledge and attitude to blood donation was reassessed between October 2017 and March 2018 at Federal Teaching Hospital Abakaliki, South-Eastern Nigeria.

The study population comprised of medical students who were undergoing their clinical training at the Federal Teaching Hospital, Abakaliki. The sample size was determined using the Taro Yamane formula for finite population,<sup>10</sup> and a minimum sample size of 169 was calculated as follows:  $N = n / 1 + N(e)^2$ , where  $n$  is the sample size,  $N$  is the finite population = 293 (total number of students in 400, 500, and 600 levels),  $1 =$  constant, and  $e$  is the level of significance (degree of accuracy) desired set at 0.05 level. Mathematically, sample size  $n = 293 / 1 + 293 (0.05)^2 = 169$ . However, the sample size was increased by 10%, giving 185 sample size to take care of attrition but out of that number, 158 students completely and correctly filled their questionnaires which were used for analysis. The participants were selected using stratified sampling technique. The participants' level of study formed the basis of each stratum. Sampling frame for the study was 293 (comprising 102, 98, and 93 students in 400, 500, and 600 levels, respectively). Proportional allocation was used to select the number of students required to partake in the study from each level. At each level, simple random sampling by ballot method was used to select those who participated in the study.

The tool for data collection was a pretested, semi-structured, interviewee-administered questionnaire adopted from previous study.<sup>11</sup> The questionnaire consisted of three sections. Section A comprised the sociodemographic characteristics of the participants, section B consisted of questions that assessed participants' knowledge of voluntary nonremunerated blood donation, and section C consisted of questions that assessed participants' attitude toward voluntary blood donation.

The questionnaires were filled by students who gave written informed consent to the study. This was followed by blood donor education on voluntary nonremunerated blood donation in the form of a workshop (the content of which include explanation on blood donation, reasons for blood donation, types of blood donation, volume of blood collected during each donation, frequency of blood donation, transfusion-transmitted infections and donor screening, measures to protect the donor, and so on) organized by experts (consultant hematologists) in blood transfusion medicine. One month after the educational intervention, the same questionnaires were administered to the same students in order to assess the effect of the blood donor educational intervention. Questionnaires with incomplete information were excluded.

## Scoring of outcome variables

### Knowledge

Ten questions were used to assess knowledge. A score of 1 was awarded for correct answers and 0 for wrong answers or unanswered question, giving a range of 0–10. Scores were converted to percentages and getting all the ten questions correctly were scored as 100% while getting none of the questions correctly were scored as 0%. The scores were graded as poor knowledge (scores 0%–49.9%), fair knowledge (scores between 50% and 69.9%), and good knowledge (scores 70%–100%).

### Attitude

Ten questions were used to assess the participants' attitude toward voluntary nonremunerated blood donation using a 5-point Likert scale. The Likert items were strongly disagree, disagree, indifferent, agree, and strongly agree, which were graded as 1 for strongly disagree, 2 for disagree, 3 for indifferent, 4 for agree, and 5 for strongly agree, giving a total minimum score of 10 and maximum score of 50.

The total attitude scores were gotten and converted to percentages and graded as negative attitude (scores 0%–49.9%), and positive attitude (scores 50%–100%).

### Ethical approval

The study was approved by the Research and Ethics Committee of Ebonyi State University, Abakaliki. In addition, informed written consent was obtained from each participant before being included in the study.

### Data analysis

Data collected were cleaned for inconsistencies in the responses, coded, and were entered into the IBM Statistical Package for Social Sciences (SPSS) software, version 20 and analyzed. Descriptive statistics was used to compute percentages and averages. Chi-square and Fisher's test were used to test for associations between variables as appropriate.  $P < 0.05$  was considered statistically significant. Results were presented in tables and charts and expressed as percentages/proportions, means, and standard deviation.

## RESULTS

### Sociodemographic characteristics

A total of 158 clinical year medical students participated in this study, giving a response rate of 93.5% (158 / 169). They comprised of 98 males and 60 females with a ratio of 1.6: 1. A higher proportion of the participants (128 [81%]) were within the age group 20–25 years and 151 (95.6%) of them single [Table 1].

### Baseline knowledge about blood donation before educational intervention

Ninety-five (60.1%) of the participants knew that donated blood is about 500 ml, 137 (86.7%) knew that the accepted age for blood donation is 18–60 years, while 96 (60.8%) knew that the accepted weight for blood donation is  $\geq 50$  kg [Table 2].

**Table 1: Sociodemographic characteristics of medical students who participated in the study**

Characteristics	Frequency (%)
Sex	
Males	98 (62)
Females	60 (38)
Total	158 (100)
Age (years)	
<20	2 (1.3)
20-25	128 (81)
26-30	23 (14.6)
>30	5 (3.2)
Total	158 (100)
Marital status	
Married	7 (4.4)
Single	151 (95.6)
Total	158 (100)

### Knowledge about blood donation after educational intervention

One hundred and forty-nine (94.3%) knew that donated blood volume is about 500 ml, 155 (98.1%) knew that a healthy adult male or female can donate blood three or four times in a year, while 157 (99.4%) know that the suitable age for blood donation is 18–60 years [Table 3].

### Effect of blood donor educational intervention on knowledge about blood donation

Educational intervention significantly improved the knowledge about blood donation among the participants with ( $P < 0.001$ ) as shown in Figure 1 and Table 4.

### Attitude and perception toward voluntary blood donation before and after blood donor educational intervention

Generally, most of the participants have positive attitude toward voluntary blood donation, but the proportion of those who have positive attitude increased after educational intervention. One hundred and thirteen (71.5%) participants agreed that blood donation has some health benefits, 115 (72.8%) agreed that voluntary blood donation is better than remunerated blood donation, 128 (81%) are willing to donate blood, while 125 (79.1%) will encourage their relations and friends to donate blood [Table 5 and Figure 2].

## DISCUSSION

Voluntary blood donors are a source of safe blood. It is important for medical students to be properly educated with correct information/knowledge on voluntary nonremunerated blood donation with the hope that it will improve their skills for donor recruitment and maintenance and ultimately impacts positively on patients' outcomes.

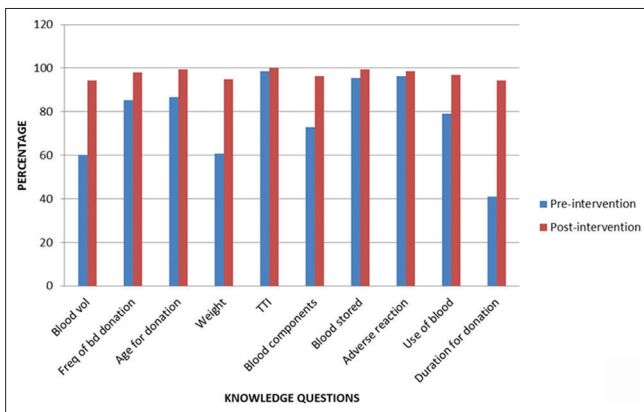
This study revealed that the most prevalent age group among the participants was 20–25 years. The most prevalent age group found in this study is lower than that found in a similar study conducted in Benin City Nigeria where the most prevalent age

**Table 2: Medical students' knowledge about blood donation before educational intervention**

Facts about blood donation	Correct responses (%)	Incorrect responses (%)
Donated blood volume is about 500 ml	95 (60.1)	63 (39.9)
A healthy adult male or female can donate three or four times in a year	135 (85.4)	23 (14.6)
Suitable age for blood donation is 18-60 years	137 (86.7)	21 (13.3)
Minimum weight for blood donation is 50 kg	96 (60.7)	62 (39.3)
Blood is screened for infections before transfusion	156 (98.7)	2 (1.3)
Donated blood can be separated into different blood components	115 (72.8)	43 (27.2)
Blood can be stored after donation	151 (95.6)	7 (4.4)
Blood transfusion can cause adverse reaction in the recipient	153 (96.8)	5 (3.2)
Donated blood can be used for more than one person	125 (79.1)	33 (20.9)
Blood donation process lasts for about 20 min	65 (41.1)	93 (58.9)

**Table 3: Medical students' knowledge about blood donation after educational intervention**

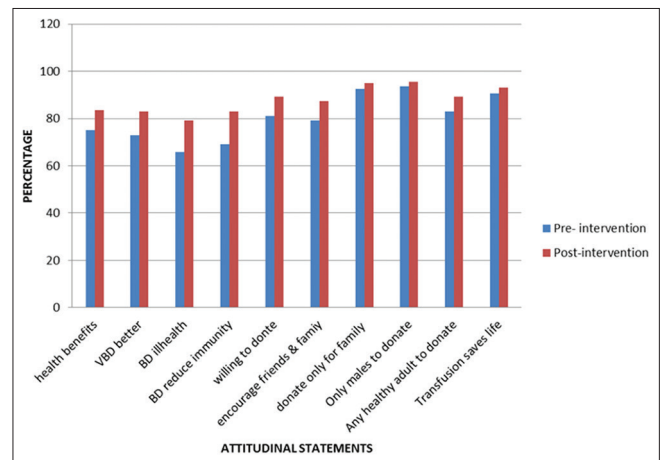
Facts about blood donation	Correct responses (%)	Incorrect responses (%)
Donated blood volume is about 500 ml	149 (94.3)	9 (5.7)
A healthy adult male or female can donate 3 or 4 times in a year	155 (98.1)	3 (1.9)
Suitable age for blood donation is 18-60 years	157 (99.4)	1 (0.6)
Minimum weight for blood donation is 50 kg	150 (94.9)	8 (5.1)
Blood is screened for infections before transfusion	158 (100)	0 (0)
Donated blood can be separated into different blood components	152 (96.2)	6 (3.8)
Donated blood can be stored for later use	157 (99.4)	1 (0.6)
Blood transfusion can cause adverse reaction in the recipient	156 (98.7)	2 (1.3)
Donated blood can be used for more than one person	153 (96.8)	7 (3.2)
Blood donation process lasts for about 20 min	149 (94.3)	9 (5.7)



**Figure 1:** Changes in knowledge level about blood donation after educational intervention

group is 25–29 years.<sup>11</sup> The reason may be because the age of entry into tertiary educational institutions is lower these days compared to what it used to be some years back. In a developing country like ours, lack of knowledge, blood donor recruitment, and retention strategy and various misconceptions have resulted in a limited number of voluntary donors. This challenge can be tackled by adopting such recruitment methods that can overcome the misconceptions and also motivate the public to donate at an early age so that they become lifelong voluntary donors.

This study also showed that more males were participated than females. This is not surprising because of our culture



**Figure 2:** Changes in attitude toward voluntary blood donation after educational intervention

in Nigeria where males are more favored.<sup>12</sup> Females are not given equal opportunities to go to school like males.<sup>12</sup> This is similar to the findings in a study conducted in Benin City, Nigeria, where more males were recorded.<sup>11</sup> Another reason may be because our culture encourages early girl child marriage<sup>13,14</sup> and so females usually get married at a younger age compared to males so will not have the opportunity of going to higher institution. Most of the participants were single. This is like the findings of previous studies,<sup>15,16</sup> This may be because most students prefer to graduate and get paying job before marriage.

This study also found that the knowledge about voluntary blood donation among the participants was good. This is similar to the findings of the study conducted by Ogboghodo *et al.* in Benin City, South-south Nigeria, who also reported good knowledge about voluntary blood donation among medical students.<sup>11</sup> In contrast, however, this study showed higher than the knowledge level reported by Ahmad *et al.*, in Kerala, India, who reported poor knowledge among the medical students that were studied.<sup>17</sup> The poor knowledge reported in their study may be because their study population was made up of medical students who were in their preclinical class (100–300 level of medical school) where the students have not been exposed to clinical course in blood transfusion medicine. Similarly, a study conducted by Urgesa *et al.* among community members in Ethiopia to determine their knowledge and attitude about blood donation found that only 43.5% of the participants had knowledge above average.<sup>18</sup> The high level of knowledge in this study compared to their own study was due to the fact that their study involved community members while we studied medical students in the clinical years of their training where medical student are taught hematology and blood transfusion medicine. Therefore, exposure to such lectures may have improved their knowledge of blood transfusion. The finding that most medical students in this study had good knowledge of blood donation is commendable as this may be a means to correct the several misconceptions that are associated with blood donation because they will also help to educate others.

This study also revealed that blood donor educational intervention significantly improved knowledge about voluntary blood donation among the participants. At baseline, 72.8% of

the participants had good knowledge about blood donation. While post intervention, the level of knowledge increased to 99.4%. This is in keeping with findings of previous studies which reported improvement in knowledge following educational intervention.<sup>19-21</sup> Education by experts in the field provides individuals and the society with the right information on a particular subject matter and eliminates ignorance and misconceptions on that issue. The basic goal of blood donor education is to promote knowledge, attitudinal change, and beliefs as well as to educate the donors about self-selection and self-exclusion. Donor education allays all fears and reinforces public confidence in safe blood supply. This can be facilitated through simple but clear messages to the target audience.

All the participants had a positive attitude toward voluntary blood donation before educational intervention. This corroborates with findings from other studies.<sup>11,16</sup> However, the positive attitude toward voluntary blood donation found among the participants before intervention was improved further after educational intervention, as also reported by previous studies.<sup>19,21</sup> This is not surprising considering the fact that the participants in the course of their medical training have been taught the lifesaving benefits of blood donation. It is, therefore, expected that good knowledge will likely bring about a positive attitude and eliminate misconceptions and fears associated with blood donation as well as improvement in the practice of voluntary blood donation. Medical students will be future medical professionals who will eventually be the ones to request and utilize blood for the management of conditions that may require blood transfusion. Hence, having positive attitude toward blood donation will translate to improved availability of voluntary blood donors among medical students. Previous studies have shown that blood donor education has positive influence on attitudes toward blood donation.<sup>22,23</sup> Finding of high level of positive attitude in this study is however, contrary to the previous studies where the researcher reported poor attitude in majority of the study participants.<sup>24,25</sup> The difference in the attitude towards blood donation could be due to variation in study population because these studies were carried out among community members while this study was carried out among medical students who

**Table 4: Effect of educational intervention on the knowledge about blood donation among medical students**

Knowledge level	Frequency (%)		$\chi^2$ (P)
	Preintervention	Postintervention	
Poor knowledge	3 (1.9)	0 (0)	46.583
Fair knowledge	40 (25.3)	1 (0.6)	(<0.001)
Good knowledge	115 (72.8)	157 (99.4)	
Total	158 (100)	158 (100)	

**Table 5: Medical students' positive attitude towards voluntary blood donation before and after blood donor educational intervention**

Attitudinal statements	Frequency (%)		$\chi^2$ (P)
	Preintervention	Postintervention	
Blood donation have some health benefits	113 (71.5)	132 (83.5)	21.45 (0.000)
Voluntary blood donation is better than remunerated blood donation	115 (72.8)	131 (82.9)	11.14 (0.032)
Blood donation causes ill health	104 (65.8)	125 (79.1)	20.69 (0.000)
I am willing to donate blood	128 (81.0)	141 (89.2)	17.30 (0.000)
I will encourage my friends and relations to donate	125 (79.1)	138 (87.3)	10.93 (0.028)
Blood should only be donated for family members and friends	144 (91.1)	146 (92.4)	4.86 (0.307)
Only males should donate blood	143 (90.5)	147 (93.0)	5.751 (0.231)
Any healthy adult can donate blood	131 (82.9)	141 (89.2)	7.031 (0.139)
Blood transfusion saves lives	143 (90.5)	147 (93.0)	1.413 (0.845)

by virtue of their training would have been better informed and so likely to have favorable attitude to blood donation.

## CONCLUSION

Medical students have good baseline knowledge and positive attitude toward blood donation at baseline, and this further improved after blood donor education intervention. Therefore, there is a need for recurrent blood donor education among potential blood donors to ensure a sustained pool of voluntary blood donors.

Limitation of this study include the fact that it was carried out among medical student who are in the clinical stage of their training, therefore generalizing the findings of this study should be done with caution.

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## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

- Gale SA, Fontaine MJ, Viele MK, Gonzalez CL, Goodnough LT. Transfusion Medicine. In: Greer JP, Arber DA, Glader B, List AF, Means RT, Paraskevas F, *et al.* editors. *Wintrobe's Clinical Hematology*. 13<sup>th</sup> ed. Philadelphia: Lippincott Williams and Wilkins; 2014. p. 547-85.
- Norfolk D. *Handbook of Transfusion Medicine*. 5<sup>th</sup> ed. United Kingdom: TSO Information Publishing Solutions; 2013.
- Sharma R, Madan N, Venkatesh S, Ichhpujani RL, Lal S. Factors influencing blood donations and the rational use of blood. *J Commun Dis* 2010;42:185-90.
- Currie CJ, Patel TC, McEwan P, Dixon S. Evaluation of the future supply and demand for blood products in the United Kingdom National Health Service. *Transfus Med* 2004;14:19-24.
- World Health Organization. *Blood Transfusion Safety*. World Health Organization; 2006. Available from: [https://www.who.int/bloodsafety/en/Blood\\_Transfusion\\_Safety.pdf](https://www.who.int/bloodsafety/en/Blood_Transfusion_Safety.pdf). [Last accessed on 2018 Dec 02].
- World Health Organization. *Strategies for Blood Donor Recruitment*. World Health Organization; 2014. Available from: [http://www.who.int/searo/2001/SEA\\_HLM\\_33.pdf](http://www.who.int/searo/2001/SEA_HLM_33.pdf). [Last accessed on 2019 Jan 06].
- Osaro E, Charles AT. The challenges of meeting the blood transfusion requirements in Sub-Saharan Africa: The need for the development of alternatives to allogenic blood. *J Blood Med* 2011;2:7-21.
- Enosolease ME, Imarengiaye CO, Awodu OA. Donor blood procurement and utilisation at the University of Benin Teaching Hospital, Benin City. *Afr J Reprod Health* 2004;8:59-63.
- Sachdev S, Mittal K, Patidar G, Marwaha N, Sharma RR, Duseja AK, *et al.* Risk factors for transfusion transmissible infections elicited on post donation counselling in blood donors: Need to strengthen pre-donation counselling. *Indian J Hematol Blood Transfus* 2015;31:378-84.
- Yamane T. *Statistics: An Introductory Analysis*. 2<sup>nd</sup> ed. New York: Harper and Row; 1967.
- Ogboghodo EO, Ofili AN, Ogunbor OJ, Ogenyi CC, Okpala C. Knowledge, attitude and practice of voluntary non-remunerated blood donation among medical students in a tertiary institution in Southern Nigeria. *J Med Biomed Res* 2015;14:105-17.
- Akinbi JO, Akinbi YA. Gender disparity in enrolment into basic formal education in Nigeria: Implications for national development. *Afr Res Rev* 2015;9:11-23.
- Adekola PO, Akanbi MA, Olawole-Isaac A. A qualitative assessment of the effects of child marriage on female education and entrepreneurship in Northeastern Nigeria. *Int J Sci Res Multidiscip Stud* 2015;2:7-15.
- Envuladu EA, Umaru RJ, Lorapuu NO, Osagie IA, Okoh EO, Zoakah AI. Determinants and effect of girl child marriage: A cross sectional study of school girls in Plateau State, Nigeria. *Int J Med Biomed Res* 2016;5:122-9.
- Mamatya A, Prajapati R, Yadav R. Knowledge and practice of blood donation: A comparison between medical and non-medical Nepalese students. *Nepal Med Coll J* 2012;14:283-6.
- Salaudeen AG, Odeh E. Knowledge and behavior towards voluntary blood donation among students of a tertiary institution in Nigeria. *Niger J Clin Pract* 2011;14:303-7.
- Ahmad A, Abraham J, Sony S, Nahla N, Pranav R, Mohammed R, *et al.* Assessment of knowledge, attitude and practice (KAP) of blood donation among MBBS Students of a Medical College in Kollam, Kerala. *J Evol Med Dent Sci* 2015;4:6086-95.
- Urgesa K, Hassen N, Seyoum A. Knowledge, attitude, and practice regarding voluntary blood donation among adult residents of Harar town, Eastern Ethiopia: A community-based study. *J Blood Med* 2017;8:13-20.
- Olatona FA, Odeyemi KA, Onajole AT, Asuzu MC. Effects of health education on knowledge and attitude of youth corps members to sickle cell disease and its screening in Lagos State. *J Community Med Health Educ* 2012;2:163.
- Ganesan S, Sandhiya S, Reddy KC, Subrahmanyam DK, Adithan C. The impact of the Educational intervention on knowledge, attitude and practice of pharmacovigilance towards adverse drug reactions reporting among health-care professionals in a tertiary care hospital in South India. *J Nat Sci Biol Med* 2017;8:203-9.
- Revathy S, Sakthibalan M, Bikash RM, Balabalajee J. Effect of educational Intervention on the knowledge and attitude on prescribing among interns of a tertiary care hospital: A questionnaire based study. *Int J Basic Clin Pharmacol* 2016;5:336-73.
- Ahmed AO. Knowledge, attitude, practice and associated factors of voluntary blood donation among undergraduate students in Hargeisa University. *J Community Med Health Edu* 2017;7:547-59.
- Olaiya MA, Alakija W, Ajala A, Olatunji RO. Knowledge, attitudes, beliefs and motivations towards blood donations among blood donors in Lagos, Nigeria. *Transfus Med* 2004;14:13-7.
- Jemberu YA, Esmael A, Ahmed KY. Knowledge, attitude and practice towards blood donation and associated factors among adults in Debre Marks town, Northwest Ethiopia. *BMC Hematol* 2016;16:23-30.
- Olubiyi SK, Babalola FR, Olubiyi MV, Umar JN, Ibraheem MA. Knowledge, attitude and practices of blood donation among adults in Ado-Ekiti, Nigeria. *Sky J Med Med Sci* 2014;2:52-7.