CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3246826

Available online at: http://www.iajps.com ***Research Article***

KNOWLEDGE, PRACTICE, AND MOTIVATIONS OF BLOOD DONATION AMONG MINISTRY OF HEALTH PRIMARY HEALTH CARE VISITORS IN JEDDAH, KSA 2018

Dr. Haifa Alshaikh[1]and Dr. Iman Mohamed Whaby[2]

[1] Resident of Family Medicine, joint program, Jeddah, KSA.

[2]*MBBS, MSC, PhD in Community Medicine, Diploma in Family medicine from Maastricht University, Diploma in Obstetrics and Gynecology*

Associate Professor of Community Medicine, King Abdul Aziz University-Faculty of Medicine - Family and Community Medicine, Jeddah, KSA

Al Azhar University- Faculty of Medicine, Egypt.

Article Received: April 2019 **Accepted:** May 2019 **Published:** June 2019

Abstract:

Background: *There is a rising demand for blood especially in the primary health care setting. Assessing the level of knowledge and motivations of blood donors is essential in order to enhance the awareness and ultimately improve the constant lack of blood in hospital units. This study aims to measure the level of knowledge, practice, barriers and motivations of blood donation among the ministry of health, primary health care visitors in Jeddah, Saudi Arabia, 2018.*

Subjects and Methods: *A cross-sectional study was conducted including 400 participants randomly selected from five primary health care centers of Ministry of Health. A self-administrative questionnaire was distributed and multi-stage sampling technique was used for data collection.*

Main Results: *Among the 400 participants, 44% of them had good knowledge score and 30% were donors. Knowledge score was statistically significant with education level [p=0.01], job description [p=0.02] and previous experience of donation [p=0.01]. In addition, male [p=0.01], aged 25-64 [p=0.01], lower income [p=0.01]; and participants with good knowledge score [p=0.00] were more likely to donate. Most common barriers to blood donation were identified as health issues [31%], lack of time [25%], and never thought about it [33%], while most frequent motivations were accessibility [77%], transporting blood donation units [73%], religious motives [76%], and media involvement [81%].*

Conclusion and Recommendation: *This study found that knowledge and practice of blood donation was limited. Further education programs should be added with expanding various aspects about donor's conditions and limitations are recommended emphasizing on the young age group and female population.*

Keywords: *Knowledge, Practices, Motivation, Blood donation, Primary health care, Visitors.*

Corresponding author:

Dr. Haifa Alshaikh,

Resident of family medicine, joint program, Jeddah, KSA

Alnakheel disrect, Jeddah, KSA

09966203660, haifa4alshaikh@gmail.com

QR code

Please cite this article in press Haifa Alshaikh., ***Knowledge, Practice, And Motivations of Blood Donation among Ministry of Health Primary Health Care Visitors In Jeddah, Ksa 2018.,*** *Indo Am. J. P. Sci, 2019; 06[06].*

INTRODUCTION:

Blood is an essential component of the human circulatory system [1]. Moreover, the need for blood transfusion is universal. Several critical conditions present on daily basis to different health sectors and hospital departments, which requires a lifesaving blood transfusion. Blood availability is counted as one of the major concerns in the society, which is dependent entirely on blood donation as the main resource. Blood donors are mainly divided into three types: volunteer donors they donate without expecting a reward in return. Donors who donate to their family or close people are called Replacement Donor and lastly the paid donors. To secure a constant, safe and reliable source for blood, WHO recommended collecting blood and blood products from voluntary, regular unpaid donors to limit the transfusion-transmitted infections and to provide a constant recourse for blood transfusion [2].

Epidemiological data on blood donation among Saudi population in 2013 showed that whole blood donors were 10-19.9 per 1000 population, with the percentage 25%-49.9 % of them were volunteer donors based on WHO global report [2]. Previous studies measured the knowledge, attitude, and factors contributing to blood donation in the targeted population. Factors, which showed to be involved in the decision making of blood donation were age, gender, religious factors education level, knowledge about blood donation and motivational reward such as a day off work [1, 3-6]. However, up to the researcher's knowledge, there were no data in Jeddah measuring the level of knowledge, practice and factors that encourage or discourage blood donation in the targeted population. Furthermore, in order to improve the constant lack of blood units, assessing the level of knowledge in the study group and their motivations to blood donation is essential by which enhancement in the awareness methods and correction of misconceptions could be achieved. Specifically, this study seeks: to estimate the level of knowledge, to assess the practice, and to identify the motivations and barriers of donating blood among ministry of health, primary health care visitors in Jeddah, KSA on 2018.

SUBJECTS AND METHODS:

Study design:

A cross-sectional descriptive study was conducted from December 2018 to February 2019 at the Ministry of Health primary health care centers in Jeddah, Kingdom of Saudi Arabia.

Study population and sampling technique:

This study included adults aged 16 years and above, who attended PHCs in Jeddah, KSA during the study period. The target sample size was calculated based on Roasoft software to detect an expected 50% prevalence of blood donation with 5% margin error and 95% CI among a total population of 3,058,800 visitors in PHC during 1437/2016. Calculated sample size was 377, which was increased to 400 to compensate for probable dropouts.

A multistage sampling technique was used in this study. Jeddah, PHC centers were clustered by MOH into 5 sectors allocated to nearest secondary care hospitals in the first stage. Stratified random sampling was conducted in the second stage wherein the sample size was equally divided into males and females from the selected 5 PHCs by equal allocation. Then the participants were chosen by random sampling from the outpatient clinic by taking all the attendees.

Research instrument and data collection:

A self-administered questionnaire was used in this study that was adopted from a previous study done in Riyadh after taking the approval to use the primary questionnaire form the author via email [3]. The researcher collected the data twice a week.

Data analysis:

The collected data were computerized and analyzed using SPSS 20 program. Descriptive analysis [univariate analysis] was done in form of categorical data which were presented as frequency [percentage], while continuous data were presented as mean ± S.D. bivariate analysis was done in a form of Chi-square which was calculated to compare categorical variables and level of significance was taken at $p<0.05$. The knowledge score was calculated based on the Likert scoring system of 3 with the answers of [I don't know, no, yes] with a score of 1 to the right answer. Participants' scores of more than 60% [7 out of the 13 questions] was categorized as good knowledge score. On the other hand, below 7 were considered as having poor knowledge. A stepwise regression analysis was further done as a multivariate analysis to determine factors contributing to blood donation knowledge score. A pilot study was done on a sample of 10% of the total sample size and was conducted in a primary health care. Participants included in the pilot study were excluded from the final result of the study.

Ethical considerations:

The study protocol and questionnaire were approved by the joint program of family medicine community and public health administration, represented by the

department of medical research and studies. Directorate of Health Affairs, Jeddah, Ministry of Health. Confidentiality was assured by anonymous data collection [numbers and initial of PHC] and coding of the collected data in the database. Written consent was obtained from all the participants prior to data gathering.

RESULTS:

Demographic characteristics of the participants: 400 participants were included in this study.The sample was obtained form MOH PHC which includes Alshate, Abdulmajeed, Faysaliah, Rugama and Quriat all garnered 20%. Males and females were equally distributed. Majority of participants were form age group of 25-46year.while 108 [27%] out of the total number of respondents were single, 269 [67%] were married, 11 [3%] were divorced and 12 [3%] were widowed. Majority of the participants were university graduate .As regards for the occupation, 145 [36%] of the respondents didn't work and[31%] worked in other sectors not mentioned. Regarding the monthly income in S.R, 255 [64%] out of the 400 participants had monthly income of less than 10,000 S.R. [table 1]

Table 1: Socio-demographic characteristics of the participants [n=400]

Demographic variable	Count	%
Primary health care		
- Al shate	80	20%
- Abdulmajeed	80	20%
- Faysaliah	80	20%
- Rugama	80	20%
- Quriat	80	20%
Type of visitors		
- Relative	194	49%
- Patient	206	52%
Gender		
- Male	200	50%
- Female	200	50%
City of residency		
- Jeddah	379	95%
- Outside Jeddah	21	5%
Nationality		
- Saudi	321	80%
- Non-Saudi	79	20%
Marital state		
- Single	108	27%
- Married	269	67%
- Divorced	11	3%
- Widow	12	3%
Level of education		
- Doesn't have a degree	11	3%
- Primary or elementary degree	63	16%
- Secondary degree	126	32%
- University graduate	188	47%
- Higher degree	12	3%

Job description		
- Doesn't work	145	36%
- Civil sector	33	8%
- Military sector	15	4%
- Education sector	44	11%
- Health sector	22	6%
- Free business	19	5%
- Else	122	31%
Monthly income in S.R.		
- Less the 10.000 S.R	255	64%
- 10.000 - 20.000 S.R.	114	29%
- More than 20.000 S.R	30	7%
Age		
- 16-24 year	72	18%
- 25-64 year	320	80%
- 65 and above	8	2%
Knowledge score		
- Poor	224	56%
- Good	176	44%

Knowledge score: 44% of the respondents had good knowledge about donating blood, while 56% had poor knowledge of blood donation.

Distribution of knowledge score of respondents to demographic variables and previous practice: the data showed statistically significant difference between the respondents' knowledge score with primary health care [P=0.017], participants from Alshate PHC and Abdulmajeed PHC were associated with good knowledge score .Job description was also statistically significant to knowledge score [P=0.01], 42% of participants with poor knowledge score were not working, other statically significant elements were level of education [P=0.01], 60% of participants with good knowledge score had university degree. Previous experience of donation was also statistically a significant to knowledge score [P=0.01] [table 2]

Table 2: Distribution of knowledge score of respondents according to demographic variables, and the previous practice among the participants.

Variable	**Knowledge**				*p* value
	Poor [224]		**Good [176]**		
Primary health care centers					
- Al shate	39	17%	41	23%	0.017*
- Abdulmajeed	35	16%	45	26%	
- Faysaliah	46	21%	34	19%	
- Rugama	53	24%	27	15%	
- Quriat	51	23%	29	16%	
Age					
- '16-24	48	21%	24	14%	0.12
- '25-64"	171	76%	149	85%	
- '65 and above'	5	2%	3	2%	

Marital status					
- Single	61	27%	47	27%	
- Married	151	67%	118	67%	0.90
- Divorced	5	2.2%	6	3.4%	
- Widow	7	3%	5	3%	
Level of education					
- Doesn't have a degree	8	4%	3	2%	
- Primary or elementary	48	21%	15	9%	0.01*
- Secondary degree	84	38%	42	24%	
- University graduate	82	37%	106	60%	
- Higher degree	2	1%	10	6%	
Job description					
- Doesn't work	95	42%	50	28%	
- Civil sector	19	8%	14	8%	
- Military sector	7	3%	8	5%	0.02*
- Education sector	21	9%	23	13%	
- Health sector	6	3%	16	9%	
- Free business	10	4%	9	5%	
- Else	66	29%	56	32%	
Previous experience of blood donation					
- No	182	81%	99	56%	0.01*
- Yes	42	19%	77	44%	
Gender					
- Male	107	48%	93	53%	0.31
- Female	117	52%	83	47%	
Previous experience of blood donation					
- No					
- Yes	182	81%	99	56%	0.01*
	42	19%	77	44%	

*P value of ≤ 0.05 is considered statistically significant

Distribution of practice of blood donation according to socio-demographics and knowledge score among studied population: the results showed statistically significant difference between the respondents who have answered that they have previous experience of blood donation with age [P=0.01], participants aged 25-64y were 87% of the donors. Gender [P=0.01] was also statistically a significant variable for blood donations; males had higher percentage of donation with 83%. Knowledge score was statistically a significant variable to blood donation practice [P=0.00]; participants with good knowledge score were 65% of the donors. Participants with lower monthly income were donors with 58%, results showed statistically significance difference between monthly income and donation [P=0.01]. [table 3]

Table 3: Distribution of practice of blood donation according to socio demographics and knowledge score among participants.

Variable	Previous experience of blood donation				
	No [281]		Yes [119]		P value
	No.	%	No.	%	
Primary health care					
- Al shate	49	17%	31	26%	0.24
- Abdulmajeed	58	21%	22	18%	
- Faysaliah	54	19%	26	22%	
- Rugama	59	21%	21	18%	
- Quriat	61	22%	19	16%	
Age					
- 16-24	62	22%	10	8%	0.01*
- 25-64	216	77%	104	87%	
- 65 and above	3	1%	5	4%	
Gender					
- Male	101	36%	99	83%	0.01*
- Female	180	64%	20	17%	
Marital status					
- Single	81	29%	27	22%	0.60
- Married	181	64.4%	88	73%	
- Divorced	9	3%	2	1%	
- Widow	10	3.5%	2	1%	
Level of education					
- Doesn't have a degree	9	3%	2	2%	0.58
- Primary or elementary degree	46	16%	17	14%	
- Secondary degree	92	33%	34	29%	
- University graduate	127	45%	61	51%	
- Higher degree	7	2%	5	4%	
Monthly income in S.R.					
- Less than 10 000 S.R/month	186	66%	69	58%	0.01*
- Between 10 000 to 20 000	81	29%	33	27%	
- More than 2 000 S.R./month	13	5%	17	14%	
Knowledge score					
Poor [0-6]	182	65%	42	35%	0.00*
Good [7-13]	99	35%	77	64%	

*P value of ≤ 0.05 is considered statistically significant

Multivariate logistic regression for factors associated independently with poor knowledge score:Level of education was highly significant with poor knowledge score; participants with primary/elementary degree [OR=16.000] followed by participants who didn't have degree [OR=13.333 95CI;055 to 1.212] and lastly participants with 2ndry degree [OR=10.000 95CI 1.77 to 100]. Participants who never experienced blood donation before were significantly associated with poor knowledge score [OR 3.370]. The job description of the participant was also linked statistically significant to poor knowledge score; jobless participants and who work in civil sector with scoring of [OR=1.612 AND 1.252] respectively. This was also seen with age where participants from age of 16-24 were more [OR=1.20] and marital state for single participants [OR=1]. [table 4]

Table 4: Logistic regression of poor knowledge towards blood donation with socio-demographic characteristics of the study samples.

Variable	sig.	OR	95 % CI
Age			
- 16-24	0.813	1.200	0.264 to 5.448
- '25-64'	0.614	0.689	0.162 to 2.930
- '65 and above'	-	-	
Marital status			
- Single	.997	1.002	.296 to 3.3
- Married	.941	.956	.295 to 3.10
- Divorced	.572	.621	.119 to 3.24
- Widow	-	-	
Level of education			
- Doesn't have a degree	0.012	13.333	0.550 to 1.212
- Primary/ elementary degree	0.001	16.000	1.775 to 100.142
- Secondary degree	0.004	10.000	3.150 to 81.264
- University graduate	0.086	3.868	2.096 to 47.717
- Higher degree	-	-	
Job description			
- Doesn't work	0.058	1.612	0.825 to18.138
- Civil sector	0.722	1.152	0.984 to 2.642
- Military sector	0.587	0.742	0.530 to 2.504
- Education sector	0.469	0.775	0.253 to 2.175
- Health sector	0.025	0.318	0.388 to1.545
- Free business	0.905	0.943	0.117 to 0.868
- Else	-	-	-
Gender			
- Male	0.3	0.810	0.543 to 1.210
- Female	-	-	0.172 to 0.425
Previous experience of donation			
- No	0.000	3.370	0.358 to 2.483
- Yes	-	-	

Barriers to blood donation: The main barriers of blood donation are health issues 32%, lack of time 29%, never thought about it 44%.

Motivations to blood donation: The most important blood donation motivations are blood donation process accessibility in PHC [77%], transporting blood donation units[73%], religious motives [76%], and media involvement [81%].

DISCUSSION:

Based on our findings, knowledge score of the samples were generally poor [56%]. This was also seen in the previous study done in Riyadh during 2013 by Alfouzan which founded a general lack of information regarding blood donation among its participants [3], as it was the case in recent study done during 2016 in Kuwait and in Jordan during 2013 [7, 8]. While during 2016 another study was done in Riyadh [16], which showed good knowledge level with a percentage of 78% among its studied population while poor knowledge level was only 22%. This may be attributed due to higher number of college graduates among its participants in comparison to the current study.

These findings were also consistent to the study conducted in Ethiopia where 54% of the participants were identified as having adequate knowledge score [9]. The current study founded only 57% of the participants had knowledge about the age of donation and only 42% had knowledge about the gap between donations. These findings were also seen in the previous study done in Riyadh by Alfouzan [3]. On

the other hand, study done by Chopra in India [10] identified high level of knowledge among their study participants of almost 90% in these specific questions which includes age of donation, gap and upshots on health. Other previous studies also found opposing report from the result of the present study [10]

According to our results, there was a substantial difference between the respondents' knowledge score and some demographic which includes the PHC center [P=0.017], job [P=0.02], level of education [P=0.01], and whether the participants have already donated blood before [P=0.01]. These findings were expected especially those with the highest good knowledge score who were university graduates [60%], as well as those who work in education sector [13%]. These participants have ease of access to the available information needed for blood donation. Centers with highest knowledge score [Alshate [23%] and Abdulmajeed [26%]] may need further investigation, so as to know their current practices and protocols and help other PHC centers in improving the level of knowledge of health care visitors on voluntary blood donation. Similar findings were found in previous studies done in Riyadh, Al-Ahsa, Ethiopia and India [3, 4, 9, 10]. In contrary to findings of the current study, studies done in Kuwait [7], in Riyadh by Alfouzan [3] and by Almutairi [11] age and gender and marital state were insignificant for good knowledge score with p value of P=0.12, P=0.30, P= 0.90 respectively. These findings could be explained due to change in the selected population and the demographics of each study population.

Also the study done by Alfouzan [3] agrees with the current study, as it founded that previous experience of donation is a significant factor for knowledge score [P=0.001]. The current study presented 77 [44%] participants with good knowledge who have previous experience in donating blood. Thus, higher than the studies conducted in Northwest Ethiopia [18.4%] [12], India [23%] [10] and Kuwait [36.5%] [7].

In terms of practice of blood donation, age, gender, monthly income and knowledge score were shown to be significant factors. Males, aged 25-64 years old, those who have monthly income of less than 10,000 riyals and participants with good knowledge score were more likely to volunteer for blood donations. The result demonstrated was in an agreement with the study conducted by Alfouzan [3] and by Almutairi [4] which also found that males had suggestively higher tendency to donate blood in comparison to the females [77.6% versus 18.6%], P=0.001. The result of this study also agreed with the study conducted in Kuwait by Al-Haqqan [7] in which males had more tendency to donate blood then females P=0.001. In contrary to our study, Al-Rahili, et al. [13] demonstrated that females [77.9%] were more likely to be donors than males [22.1%]. This was also shown in a study done in Africa [14]. They stated that females were more willing to donate because of their enthusiasm to participate in extracurricular activities and their willingness to help others. They also found that majority of donors were at a younger age group of 21-23 years old [61.8%], in comparison to the current study findings wherein older population of 25-64 years were more willing to partake in voluntary blood donation. The practice of donation was linked to knowledge score in the current study [P=0.00]; this was also seen in the study done by Al-Haqqan in 2016 [7] where the was a significant association between knowledge score and practice of donation [P=0.001] .

The current study also determined the significant barriers affecting the decision of donation among the participants in the five PHC centers. Among those were health issues [31%], fear [12%], lack of time [25%], never thought about it [33%], no need to donate [10%], difficulty reaching the center [14%], and family restrictions [9%]. Supporting these findings, past literature stated that fear of donating blood and shortage of time were the chief barriers in Saudi Arabia and several developing countries [15].A similar study also discussed the reasons for never having donated blood before as a result wherein they have named fear of needles [64.5%] and never felt the need to donate [39%] [16]. This was also supported by the study of Almuitari and colleagues [11] where they mentioned that the foremost reasons of their participants for not donating blood is that they do not have reasons for not donating [31.6%], they did not donate as they were not asked to [26.4%] and they thought that they are not qualified to donate [22.5%]. Other reasons were also reported such as fear of needles, fear of feeling unwell, did not have time to donate, difficulty in transportation and risk of becoming infected of diseases A study in Saudi also added that non-donors have this kind of perception that there's a harmful effect once you donated blood [15]. A Jordanian study indicated that not getting blood when needed was the sole chief barrier that affects blood donation [8]. Furthermore, current study identified significant reasons for motivating blood donors including media involvement [81%], blood donation accessibility through PHC [77%] and religious motive [76%]. A previous Saudi Arabian study showed that the foremost influences for blood donors were to help family or friend, saving others' lives, religious reasons and altruism [5]. The current

study found similar findings to the study conducted by Alfouzan [3] where 79.1% of its participants considered mobile caravans in public area a motivation for donation, while in the current study 73% had chosen it as a motive for donation. A contradicting result found that motivations for blood donation were one day off work with 81.4% [3], while our study found only 57% of the participants thought of it as a motive.

CONCLUSION:

The study showed high rate of poor knowledge among the studied population about blood donation. Knowledge score was higher among males, age from 25 to 64, with higher degree and who had previous experience in blood donation. The practice of blood donation was still limited among the participants in this study. Male, older age, lower income and participants with good knowledge score were more likely to donate. The main barriers were lack of time, health issues and never thought about it. The main motivation to be considered for blood donation was religious behavior, media involvement and blood donation accessibility through PHC centers.

Recommendations:

Further education programs should be added with expanding various aspects about donor's conditions and limitations to donations with focusing about gained benefits from donation through media and public awareness campaigns. Implementation of easier access to donation centers should be considered as a center in every district, or an access through PHC. More awareness should be directed towards females and younger adults.

REFERENCES:

1. Abolfotouh MA, Al-Assiri MH, Al-Omani M, Al Johar A, Al Hakbani A, Alaskar AS. Public awareness of blood donation in Central Saudi Arabia. Int J Gen Med. 2014;7:401-10.
2. World Health Organization. Global status report on blood safety and availability. 2016 Accessed: March 3, 2019; Available from: https://apps.who.int/iris/bitstream/handle/10665/254987/9789241565431-eng.pdf;jsessionid=B44C3333A007335640308FD9C2B1B268?sequence=1.
3. Alfouzan N. Knowledge, attitudes and motivations towards blood donation among King Abdulaziz Medical City population. Int J Fam Med. 2014;2014[Article ID 539670].
4. AlmuTairi AT, Alhatlan HM, AlBujays IA, Almulhim AS. Blood donation among Al-Ahsan population in Saudi Arabia: Attitudes, practice and obstacles. Int Res J Public Environ Health. 2016;3:167-73.
5. Baig M, Habib H, A HH, F TA, A MN, R GM. Knowledge, Misconceptions and Motivations Towards Blood Donation Among University Students in KSA. Pak J Med Sci. 2013;29[6]:1295-9.
6. Bashawri LA. Pattern of blood procurement, ordering and utilization in a University Hospital in Eastern Saudi Arabia. Saudi Med J. 2002;23[5]:555-61.
7. Al-Haqqan T, Husain A, Al-Kandari N, Al-Rashidi L, Al-Daihani N, Mitra AK. A cross-sectional study of knowledge, attitude, practice, and barriers regarding blood donation among general population in Kuwait. Int J Community Fam Med. 2016;1[120].
8. Abderrahman BH, Saleh MYN. Investigating knowledge and attitudes of blood donors and barriers concerning blood donation in Jordan. Procedia Soc Behav Sci. 2014;116:2146-54.
9. Tadesse W, Ayalew Y, Yisma E, Liben ML, Wudu M. Knowledge, attitude, practice and associated factors towards voluntary blood dontation among regular health science students of Samara University, Ethiopia. Health Sci J. 2018;12[1]:542.
10. Chopra D, Jauhari N. Knowledge attitude & practices towards voluntary blood donation among medical students in Barabanki. Indian J Comm Health. 2015;27[3]:386-90.
11. Almutairi SH, Almalaq AA, Albalawi YM, Aloufi RM, Al-Mutairi MR, Albiek AF. Assessment of knowledge, attitude and practice [KAP] of Saudi adult toward blood donation in Riyadh City, 2017. Egypt J Hosp Med. 2018;70[3]:507-10.
12. Melku M, Terefe B, Asrie F, Enawgaw B, Melak T, Tsegay YG, et al. Knowledge, attitude, and practice of adult population towards blood donation in Gondar Town, Northwest Ethiopia: A community based cross-sectional study. J Blood Transfus. 2016;2016[Article ID 7949862].
13. Al-Rahili NH, Al-Johani WA, Al-Mutairi MA, Al-Rehaili SH, Al-Suhaymi IA, Al-Nazzawi AO. Knowledge and intentions toward blood donation among medical students of Taibah University, Madinah, Saudi Arabia 2015. Int J Innov Res Develop. 2015;4[13]:174-81.
14. Shaz BH, Demmons DG, Crittenden CP, Carnevale CV, Lee M, Burnett M, et al. Motivators and barriers to blood donation in African American college students. Transfus Apher Sci. 2009;41[3]:191-7.
15. Alam M, Masalmeh Bel D. Knowledge, attitudes and practices regarding blood donation among

the Saudi population. Saudi Med J. 2004;25[3]:318-21.
16. Arora P, Arora M, Kotwal A. Voluntary blood donation: Perception and practices among adult population of a semi-urban area of Delhi. Natl J Community Med 2017;8[6]:349-52.
17. 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[1]:13-7.